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The Rubber Tree of South Africa, *Funtumia elastica* Stapf., is the best known rubber tree of this family. *Alstonia scholaris* R. Br. of South Asia, *Dyera castulata* Hook. of the same region, *Dyera Lowii* Hook. of Borneo (the latter two producing the resinous product called Jelutong), *Mascarenhasia* sp. of Madagascar, and several species of *Plumiera* from Mexico are also trees that produce more or less rubber.

"Another family of scientific interest is the Celastraceae. Many members of this family possess special caoutchouc cells in the stems, leaves, and fruit. These plants do not "bleed" on cutting, but the threads of caoutchouc are found scattered throughout the plant tissues of recent growths and may be separated by mechanical means.

"Several tropical genera of Loranthaceae furnish rubber known as Mistletoe Rubber. They are of no commercial importance."

Dr. Marshall A. Howe exhibited a very beautiful and instructive series of dried specimens of marine algae from Monterey Bay, California, owned by Mr. H. B. Snyder of New York City. Comments upon the rare forms were made and some comparisons were instituted between these luxuriant well-prepared specimens and those that commonly find their way into herbaria.

Dr. W. A. Murrill then exhibited a recently collected specimen of *Arcturus borealis*.

Meeting adjourned to October 10, 1911.

B. O. DODGE,
Secretary

OF INTEREST TO TEACHERS*

GENERAL SCIENCE COURSES

Among other views on general biology W. L. Eikenberry's article (*School Science and Mathematics*, September, 1910) mentions two facts that are not always recognized in framing such general courses. The first is related to the three part courses now popular as a first year course.

"The present tendency toward the use of 'immediately useful' or economic materials has stimulated the attempt to organize the old materials of general biology about human hygiene in order to give some sort of continuity to the whole. Just what real connection the teachers may in practice succeed in giving to such a course it is not the province of this paper to present; but upon the face of the printed courses and texts it would appear that the result has been to add to the old dual course a third element already familiar in the schools as human physiology. That there is actually more connection between the parts than appears on the surface is doubtless true, but such connection is dependent upon the personal equation of the teacher and exists rather in spite of the formal organization of the materials than in consequence of it. With respect to the texts, it is interesting to note that the three parts may be so wholly independent that they are issued without change, separately bound, for use in those schools in which only one of the sciences is taught. The old authors with their natural history have in many respects come closer to a solution than we with our biology."

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* Conducted by Miss Jean Broadhurst, Teachers College, Columbia University.

The second shows that the unification of such courses has its difficulties and disadvantages. After showing that botany and zoölogy are divergent rather than parallel sciences, the selection of man as the unifying object is discussed, "The increasing interest in the economic phases of the sciences has stimulated the suggestion that the grouping of materials might be made about man's interest and activity, relating everything to man's use and regarding everything from the point of view of its utilization by him. This certainly has the advantage over former courses that a coherent classification is possible, and that the course can be organized as a unit. It is open to doubt, however, whether such a self-centered arrangement of the pupil's environment is desirable either scientifically or pedagogically."

Mr. Eikenberry thinks that there "is the further disability that when a science is organized with reference to man's more or less random utilization of its materials, such great gaps are left in its structure that it becomes merely a collection of unrelated fragments; it ceases to be a science. The most heterogeneous things are often brought together by man for his purpose as when a building is constructed of burnt clay, limestone, hair, pine wood, sheet iron, and a multitude of equally diverse materials. If these things be studied from the viewpoint just mentioned any knowledge of those characteristics which are not intimately connected with their availability as structural materials is merely a collection of fugitive items without relation or connection. The mind may become stored with 'a thousand wonders of land and sea' but if these facts be unrelated and unconnected its condition is after all somewhat comparable to that of a dictionary which an acquaintance of mine described as 'mighty interesting reading but powerful disconnected.'

"Unrelated facts are of course unexplained and such a mass of highly interesting information is known only in an empirical way as much of it was known long before the birth of the sciences. If a science is to be taught the gaps must be filled up in such manner that the knowledge will be, if not continuous, at least orderly. This does not necessitate the omission of the materials selected from everyday life and related to human needs but it does require a careful selection among these and the addition to the 'practical' materials thus selected of those more practical materials which are fundamental to an understanding of the field and from which most of the practical scientific knowledge has arisen."

The conservation policies as established under the Roosevelt administration have been strengthened by two recent decisions of the Supreme Court. Both cases dealt originally with grazing on national reservations. Because of the arguments brought forward, the decisions do more than protect the forest reservations in these cases; they close the State's rights refuge to the enemies of conservation; and the second does away with the squabble over delegating legislative power by Congress, affirming that there are certain powers that Congress can either exercise or delegate, and that when it does delegate these powers it does not change their character from administrative to legislative by making the violation punishable.

Seven addresses on botanical teaching were made at the Minneapolis meeting in December (A. A. A. S.; *Science*, April 28).

Professor Charles E. Bessey discussed the preparation of botanical teachers; Professor O. Caldwell, the product of our botanical teaching; Professor F. E. Clements, methods of botanical teaching; discussion by Professor John M. Coulter and Frederick C. Newcombe followed. Professor Bessey regretted the passing of the old type of field botany, and that nothing in the present courses really takes its place; he also notes the heavier requirements of botanists for the college degrees in botany, when compared with the demands in other sciences and suggests that we are "putting too high a value on what we are putting into our students, and neglecting the man himself." Professor Caldwell (these abstracts are not complete in any sense) felt that we "need more students who early in life have begun to *think botany* and to think in the scientific method." Professor Clements noted the "failure of botany to provide a definite avenue to a position such as is offered by courses in law, medicine, engineering," etc.; he also regretted the specialized tendency that permeates nearly all elementary botanical teaching, feeling that even the microscope is "far too special an instrument for the beginner."

The English government has voted $250,000 for agricultural research, including plant and animal physiology, pathology, and breeding, and agricultural zoölogy, and fruit breeding. This appropriation is accompanied by a yearly sum of $15,000 for special investigation. The scheme includes grants to various educational institutions (a separate subject to be treated by each institution receiving aid) for investigation and scientific advice to farmers.

Professor Forrest Shreve has experimented with the giant cactus (*Carnegiea gigantea*) working out the influence of low temperatures on its distribution. The paper includes curves showing the daily rise of internal temperature in the giant cactus on a cold day.

The chief factors limiting the northward range of sub-tropical species are: "the greatest number of consecutive hours during which the temperature falls below freezing; the total number of hours of frost in a single winter; the absolute minimum reached and the length of the winter, reckoned from the first frost of autumn to the last one of spring." The first and third are considered the most important; and Professor Shreve states that the "occurrence of a single day without mid-day thawing, coupled with a cloudiness that would prevent the internal temperature of the cactus from going above that of the air, would spell the destruction of *Carnegiea* and the parallel evidence of the climatological records and of the experiments which have been described appears to explain the limitation of its northward distribution."

A Cornell pamphlet by T. L. Lyon and J. A. Bizzell on a heretofore unnoted benefit from the growth of legumes states that the fact that "a legume may benefit a non-legume growing with it, by causing the non-legume to contain a larger quantity of nitrogen or protein, seems never to have been ascertained."

Alfalfa, red clover, peas, timothy, and oats were the principal plants used in the experiments described . Timothy grown *with* either alfalfa or clover showed a large increase per ton (50 pounds grown with alfalfa, 160 with clover) in protein content; oats with peas showed a gain also. These legume-bearing soils also contained more nitrates *after* the crops had been removed. Alfalfa formed nitrates much more rapidly than clover — the rate being, of course, an important factor in relation to the removal of nitrates by roots and by drainage. Alfalfa soils (five years' growth) contained more nitrates than similar timothy soils. Lime, it was demonstrated, improved the protein content of alfalfa and of non-legumes.

The United States Bureau of Education has issued a Bibliography of Science Teaching (No. 446) compiled by a committee of the American Federation of Teachers of the Mathematical and Natural Sciences. The citations have been carefully verified, and it makes a valuable contribution to science teaching.

Pennsylvania has begun a systematic campaign against the chestnut blight. Up to 1911 the Department of Agriculture estimates the country's loss at $25,000,000. In Pennsylvania there are large areas not yet invaded by the chestnut disease, and $275,000 have been appropriated for studying and combating the disease.

An anti-frost candle has been added to the protective devices (smudges, oil heaters, firepots, etc.) for fruit trees. The candles contain a slow burning substance and can be suspended near the fruit, distributing heat at the level most needed.

The state board of education of Utah has recently ruled that every high school which receives support from the maintenance fund provided for high schools must teach agriculture. Utah is probably as good a state as any in which to enforce the teaching of agriculture; not only because of the proportion of farm land, but because of the peculiar conditions attending western farming. Nevertheless, such legislation is hardly the best thing for any new subject. This is particularly true of agriculture which to be well taught demands a good biological foundation and some practical experience. Compulsory adoption of a new subject forces poorly prepared teachers into the work, and is a disadvantage which wise advocates — even the most enthusiastic — would try to avoid.

It is to be hoped that the Utah provisions are in the form of an increased appropriation for such schools as include agriculture in the curriculum, and not an enactment making it compulsory upon pain of losing the entire state appropriation.

In repeating some of Overton's plasymolysis experiments with living cells Professor W. T. V. Osterhout (*Science*, August 11) finds that the "usual methods of determining osmotic pressure by plasmolyzing in salts of Na and K is very erroneous. Salts of Ca give more nearly the true osmotic pressure."

Solutions of calcium chloride and sodium chloride — each too weak to cause plasmolysis — caused very prompt and strong plasmolysis which mixed together; this indicates that "it is unsafe to use the common method of adding a toxic to a non-toxic substance and judging the penetration of the former by the plasmolytic action of the mixture." Among other of Osterhout's conclusions is the proteid (and not lipoid) nature of the cell membrane.

W. H. Blanchard, who has described more than forty species and forms of *Rubus* during the last few years, writes in the September BULLETIN thus: "I venture to say and say with confidence, that eight species include the great bulk of our blackberries, perhaps ninety per cent. of them."

NEWS ITEMS

Dr. Bradley M. Davis, formerly of Cambridge, Mass., has been appointed assistant professor of botany at the University of Pennsylvania.

We learn from the *Evening Sun* (Oct. 19) of the resignation of Dr. M. T. Cook as plant pathologist for the State of Delaware and Delaware College, to accept a similar position with the State of New Jersey and Rutgers College.

Dr. N. L. Britton was the host at a dinner given on October 23, 1911, in honor of Professors W. L. Johannsen, R. H. Harper, W. G. Marquette and Mr. A. B. Stout. The staffs of the Columbia University, Barnard College, College of the City of New York, Normal College, New York Botanical Garden and Brooklyn Botanic Garden were present.

Dr. W. H. Brown (Hopkins '10) has gone to Manila as botanist to the Philippine Bureau of Science.

At the New York Botanical Garden Mr. A. B. Stout has been appointed director of the laboratories to succeed Mr. F. J. Seaver who has been appointed a curator. Dr. W. A. Murrill has gone to the Pacific coast to collect fleshy fungi.

Mr. C. A. Schwarze has been appointed an assistant in botany at Columbia University.